

### **AMENDMENTS TO THE CLAIMS**

Please amend the above-identified application by adding new Claims 35-54 and canceling, without prejudice, Claim 1.

#### **In The Claims**

Claims 1-34: (Cancelled)

35. (Newly added) A method of identifying a maximum amplitude input signal within a plurality of analog input signals, comprising the steps of:

(a) providing said plurality of analog input signals to an amplitude sensing stage,

(b) generating a channel identification from said amplitude sensing stage corresponding to said maximum amplitude input signal of said plurality of analog input signals, said maximum amplitude input signal having an amplitude which has the highest signal amplitude of said plurality of analog input signals, and

(c) passing said maximum amplitude input signal to an output using said channel identification.

36. (Newly added) The method of claim 35, wherein said amplitude sensing stage includes a noise floor threshold circuit and where said maximum amplitude input signal has an amplitude which exceeds a noise floor threshold.

37. (Newly added) The method of claim 36, further comprising the step of providing said channel identification to a digital control section wherein said digital control section ensures said maximum amplitude input signal is passed to said output.

38. (Newly added) The method of claim 37, further comprising the step of providing said plurality of analog input signals and a multiplexer selection signal to a multiplexer stage wherein said digital control section uses said channel identification to generate said multiplexer

selection signal and said multiplexer selection signal is used by said multiplexer stage to pass said maximum amplitude input signal to said output.

39. (Newly added) The method of claim 38, further comprising the step of masking out selected inputs to said amplitude sensing stage in response to a control signal from said digital control section.

40. (Newly added) The method of claim 39, further comprising the step of shaping at least one analog input signal of said plurality of analog input signals prior to receipt of said plurality of analog input signals by said multiplexer stage.

41. (Newly added) The method of claim 40, further comprising the step of controllably amplifying at least one analog input signals of said plurality of analog input signals prior to receipt of said plurality of analog input signals by said multiplexer stage.

42. (Newly added) The method of claim 41, further comprising the step of retaining a sample of a signal level of at least one analog input signal of said plurality of analog input signals in a sample and hold circuit.

43. (Newly added) The method of claim 42, further comprising the step of suppressing digital noise by holding portions of said digital control section in a substantially static mode during time periods when said sample is taken so that reduced levels of digital noise are generated and coupled into said sample and hold circuitry and said multiplexer stage.

44. (Newly added) A method of identifying an acceptable maximum amplitude input signal within a plurality of analog input signals, comprising the steps of:

(a) receiving said plurality of analog input signals into a multi-channel detector readout device,

(b) sampling and holding a plurality of amplitudes corresponding to said plurality of analog input signals,

(c) receiving said plurality of amplitudes and a digital line select output signal into a multiplexer,

(d) receiving said plurality of amplitudes and a noise threshold reference signal into an amplitude sensing circuit,

(e) identifying said acceptable maximum amplitude input signal which exceeds said noise threshold reference signal and which has the maximum amplitude of said plurality of analog input signals,

(f) providing a digital line select output from said amplitude sensing circuit corresponding to said acceptable maximum amplitude input signal, and

(g) routing said acceptable maximum amplitude input signal to a singular output of said multiplexer.

45. (Newly added) The method as recited in claim 44, further comprising the steps of:

receiving said digital line select output from said amplitude sensing circuit into a digital control section, and

controlling said multiplexer using said digital line select output to pass a signal corresponding with said digital line select output from the amplitude sensing circuit.

46. (Newly added) The method as recited in claim 45, further comprising the steps of:

amplifying at least one input signal of said plurality of analog input signals in a controllable amplification stage preceding the sample and hold circuits, and

controlling the amount of amplification introduced by said controllable amplification stage with signals received therein from said digital control section.

47. (Newly added) The method as recited in claim 46, further comprising the step of providing compensation of channel to channel differences in background amplitude with a

controllable resistance reset device connected between the input and output of the controllable amplification stage.

48. (Newly added) The method as recited in claim 47, further comprising the steps of:

masking selected input signals to said amplitude sensing circuit with a channel masking circuit, and

directing said channel masking circuit with said digital control section.

49. (Newly added) The method as recited in claim 48, further comprising the step of providing for the testing of said multi-channel detector readout circuit without disconnecting input signals connected thereto with a test circuit input connected to the individual inputs of said sample and hold circuits.

50. (Newly added) The method as recited in claim 49, further comprising the step of controlling test signal receipt by said sample and hold circuits with a switch which is connected between said test circuit input and said sample and hold circuits.

51. (Newly added) A method for identifying an acceptable maximum amplitude input signal within a plurality of analog input signals which exceeds a noise floor threshold, comprising the steps of:

(a) means for generating a plurality of amplitudes corresponding to said plurality of analog input signals and a digital line select output signal into a multiplexer,

(b) receiving said plurality of amplitudes and a noise threshold reference signal into an amplitude sensing circuit,

(c) identifying said acceptable maximum amplitude input signal which exceeds said noise threshold reference signal and which has the maximum amplitude of said plurality of analog input signals,

(d) providing a digital line select output from said amplitude sensing circuit corresponding to said acceptable maximum amplitude input signal, and

(e) routing said acceptable maximum amplitude input signal to a singular output of said multiplexer.

52. (Newly added) The method as recited in claim 51, further comprising the steps of:

receiving said digital line select output from said amplitude sensing circuit into a digital control section, and

controlling said multiplexer using said digital line select output to pass a signal corresponding with said digital line select output from the amplitude sensing circuit.

53. (Newly added) The method as recited in claim 52, further comprising the steps of:

amplifying at least one input signal of said plurality of analog input signals in a controllable amplification stage preceding the sample and hold circuits, and

controlling the amount of amplification introduced by said controllable amplification stage with signals received therein from said digital control section.

54. (Newly added) The method as recited in claim 53, further comprising the step of providing compensation of channel to channel differences in background amplitude with a controllable resistance reset device connected between the input and output of the controllable amplification stage.